

# CURRICULUM VITAE

SZE-MAN NGAI

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## EDUCATION

Ph.D. Mathematics	University of Pittsburgh, PA, USA	08/1995
M.A. Mathematics	University of Pittsburgh, PA, USA	12/1989
B.Sc. Mathematics/Physics	University of Hong Kong, Hong Kong	07/1987

## AREAS OF RESEARCH

**Field of Specialization:** Fractal geometry.

**Research Topics:** Partial differential equations on fractals, iterated function systems, multifractal measures, Hausdorff dimension, self-affine tilings, Markov chains on fractals.

## ACADEMIC POSITIONS

Professor	Georgia Southern Univ., USA	08/2011–
Visiting Scholar	Harvard Univ., USA	08/2016–07/2017
Adjunct Professor	Hunan Normal Univ., China	09/2011–
Associate Professor	Georgia Southern Univ., USA	08/2006–07/2011
Assistant Professor	Georgia Southern Univ., USA	08/2000–07/2006
Xiaoxiang Scholar	Hunan Normal Univ., China	01/2010–08/2011
Visiting Scholar	Chinese Univ. of Hong Kong	09/2012–01/2013, 08/2011–12/2011 08/2008–01/2009, 01/2004–05/2004
Visiting Assistant Prof.	Georgia Tech., USA	09/1998–08/2000
Visiting Assistant Prof.	Cornell Univ., USA	01/1998–08/1998
Postdoctoral Fellow	Chinese Univ. of Hong Kong	01/1996–12/1997
Instructor	Chinese Univ. of Hong Kong	08/1995–12/1995

## PROFESSIONAL EXPERIENCE

- (1) (a) Organizer, “*Joint Carnegie Mellon - Georgia Southern Workshop on Fractal Geometry and Analysis*”, April 18 - 19, 2015, Georgia Southern University and Carnegie-Mellon University.

- (b) Organizer, Special Session on “*Fractals and Tilings*”, American Mathematical Society’s Spring 2015 Central Sectional Meeting, March 14–15, 2015, Michigan State University.
  - (c) Organizer, “*Workshop on fractal geometry and related topics*”, Sun Yat Sen University, Guangzhou, Guangdong, China, December 20–21, 2013.
  - (d) Organizer, “*Workshop on fractal geometry and dynamical systems*”, Hunan Normal University, Changsha, Hunan, China, May 25–26, 2012.
  - (e) Local coordinator and contact person, “*American Mathematical Society’s Spring 2011 Southeastern Sectional Meeting*”, March 12–13, 2011, Georgia Southern University.
  - (f) Organizer, Special Session on “*Fractals and Tilings*”, American Mathematical Society’s Spring 2011 Southeastern Sectional Meeting, March 12–13, 2011, Georgia Southern University.
  - (g) Member, Local Organizing Committee, and organizer of “*Special Session on Fractals and Tilings*”, Summer Conference on Topology and its Applications, Georgia Southern University, Statesboro, GA, July 2006.
  - (h) Co-organizer, “*Workshop on Wavelets and Their Applications*”, The Chinese Univ. of Hong Kong, May 1997.
- (2) Reviewer, *Mathematical Reviews*, American Mathematical Society, 2005–present.
  - (3) Guest editor, *Topology Proceedings*, 2006–2007.
  - (4) Grant proposal reviewer for: 1) *Natural Sciences and Engineering Research Council of Canada’s Discovery Grant (2012)*; 2) *Austrian Science Fund (2011)*; 3) *National Natural Science Foundation of China (2013, 2016)*.
  - (5) Served as a referee for over 38 mathematics journals. *Acta. Math. Scientia* (2011), *Adv. Appl. Math.* (2005), *Adv. Math.* (2016), *Aequationes Math.* (2006), *Appl. Comput. Harmon. Anal.* (1998), *Ann. Inst. H. Poincaré Probab. Statist.* (2004), *Asian J. Math.* (2003, 2005), *Bernoulli* (1998), *Canad. J. Math.* (2017), *Chaos, Solitons & Fractals* (2013), *Constructive Approximation* (2008), *Discrete Comput. Geom.* (2003, 2009), *Dyn. Syst.* (2008), *Experiment. Math.* (1999, 2002, 2005), *Ergodic Theory Dynam. System* (2010), *Fractals* (2010(twice), 2011, 2014(twice), 2017), *Integers* (2013), *Int. J. Nonlinear Sci.* (2008), *J. Anal. Math.* (2001), *J. Appl. Probab.* (2008), *J. Approx. Theory* (2005), *J. Differ. Equations Appl.* (2003), *J. Diff. Geom.* (2017), *J. Fractal Geom.* (2014, 2016, 2017), *J. Fourier Anal. Appl.* (2016), *J. London Math. Soc.* (2004), *J. Math. Anal. Appl.* (2007, 2012), *J. Math. Soc. Japan* (2010), *Math. Nach.* (2007), *Math. Proc. Camb. Phil. Soc.* (2015), *Math. Z.* (2006), *Nonlinearity* (2010), *Proc. Amer. Math. Soc.* (2012, 2015), *Real Anal. Exchange* (2014), *Sci. China Math.* (2011), *SIAM J. Math. Anal.* (2002), *Topo. Appl.* (2007), *Trans. Amer. Math. Soc.* (2008).

## HONOR

Culver-Teplitz Memorial Award for outstanding performance in research and teaching, 1992, Univ. of Pittsburgh.

## RESEARCH GRANTS

### 1. External, as PI

- National Natural Science Foundation of China, grant no. 11771136, *Decomposition of fractals and anomalous phenomena in analysis on fractals*, PI, Chinese Yuan (CNY) 480,000 ( $\approx$  US \$76,600), 01/01/2018–12/31/2021.
- National Natural Science Foundation of China, grant no. 11271122, *Boundary theory, outer approximation, and differential equations on fractals*, PI, Chinese Yuan (CNY) 600,000 ( $\approx$  US \$95,000), 01/01/2013–12/31/2016.

### 2. External, as Co-I

- Hong Kong Research Grants Council's General Research Fund, grant no. 14316816, *Induced Dirichlet form on self-similar sets*, Co-I (PI: Ka-Sing Lau), Hong Kong dollar \$727,647 ( $\approx$  US \$93,800), 01/01/2017–12/31/2019.
- Hunan Natural Sciences Foundation, *Structure of fractal tiles and embeddings of fractal sets*. Co-I (PI: Da-Wen Deng), Chinese Yuan (CNY) 30,000 ( $\approx$  US \$4700), 01/01/2012–12/31/2014.
- Hong Kong Research Grants Council's General Research Fund, *Boundary theory and analysis on fractals*, Co-I (PI: Ka-Sing Lau), Hong Kong dollar \$930,800 ( $\approx$  US \$120,000), 9/2010–8/2013.
- Hong Kong Research Grants Council's Earmarked Research Grant, *Analysis on fractals and metric-measure spaces*, Co-I (PI: Ka-Sing Lau). Hong Kong dollar \$445,000 ( $\approx$  US \$57,000), 9/1/2007–8/31/2010.
- Hong Kong Research Grants Council's Earmarked Research Grant, *Iterated function systems of finite type and matrix representation*, Co-I (PI: Ka-Sing Lau) Hong Kong dollar \$308,000 ( $\approx$  US \$39,487), 9/1/2005–8/31/2008.

### 3. Internal, as PI

- Faculty Research Scholarly Pursuit Funding Award, Georgia Southern Univ., *Mathematical theory for some anomalous phenomena on fractals*, PI, 07/01/2017–05/31/2018.
- Faculty Research Scholarly Pursuit Funding Award, Georgia Southern Univ., *Wave propagation speed conjecture on fractals*, PI, 07/2014–05/2015.

- Faculty Research Grant, Georgia Southern Univ., *Partial differential equations on fractals*, PI, 06/2012–05/2013.
- Faculty Research Grant, Georgia Southern Univ., *Martin boundary and differential equations on fractals*, PI, 08/2010–05/2011.
- Faculty Research Grant, Georgia Southern Univ., *Laplace operators on non-postcritically finite fractals*, PI, 06/2007–05/2008.
- Faculty Research Stipend, Georgia Southern Univ., *Some fundamental problems in the theory of fractal reptiles*, PI, 06/2002–05/2003.
- Faculty Research Grant, Georgia Southern Univ., *Analysis of fractal measures*, PI, 07/2001–06/2002.
- Academic Excellence Awards, College of Science and Technology, Georgia Southern Univ. (2001, 2002, 2003).

## PUBLICATIONS

- (1) G. Deng, C. Liu, and S.-M. Ngai, Topological properties of a class of self-affine tiles in  $\mathbb{R}^3$ , *Trans. Amer. Math. Soc.* **370** (2018), 1321–1350.
- (2) G. Deng and S.-M. Ngai, Differentiability of  $L^q$ -spectrum and multifractal decomposition by using infinite graph-directed IFSs, *Adv. Math.* **311** (2017), 190–237.
- (3) S.-M. Ngai and J. Tong, Infinite iterated function systems with overlaps, *Ergodic Theory Dynam. Systems* **36** (2016), 890–907.
- (4) G. Deng, C. Liu and S.-M. Ngai, Dimensions of the boundary of a graph-directed self-similar set with overlaps, *Houston J. Math.* **42** (2016), 179–210.
- (5) J. Liu, S.-M. Ngai, and J. Tao, Connectedness of a class of two-dimensional self-affine tiles associated with triangular matrices, *J. Math. Anal. Appl.* **435** (2016), 1499–1513.
- (6) J. F.-C. Chan, S.-M. Ngai, and A. Teplyaev, One-dimensional wave equations defined by fractal Laplacians, *J. Anal. Math.* **127** (2015), 219–246.
- (7) D.-W. Deng and S.-M. Ngai, Eigenvalue estimates for Laplacians on measure spaces, *J. Funct. Anal.* **268** (2015), 2231–2260.
- (8) D.-W. Deng and S.-M. Ngai, Fractal tiles and quasidisks, *Math. Z.* **279** (2015), 359–387.
- (9) Q.-R. Deng and S.-M. Ngai, Dimensions of fractals generated by bi-Lipschitz maps, *Abstr. Appl. Anal.* **2014**, Art. ID 549741, <http://dx.doi.org/10.1155/2014/549741>.
- (10) K.-S. Lau and S.-M. Ngai, Boundary theory on the Hata tree, *Nonlinear Anal.* **95** (2014), 292–307.

- (11) Q. Deng, K.-S. Lau, and S.-M. Ngai, Separation conditions for iterated function systems with overlaps, *Contemp. Math.* **600** (2013), 1–20.
- (12) D.-W. Deng, T. Jiang, and S.-M. Ngai, Structure of planar integral self-affine tilings, *Math. Nachr.* **285** (2012), 447–475.
- (13) S.-M. Ngai, Singularity and  $L^2$ -dimension of self-similar measures, *Chaos Solitons Fractals* **45** (2012), 256–265.
- (14) K.-S. Lau and S.-M. Ngai, Martin boundary and exit space on the Sierpinski gasket, *Sci. China Math.* **55** (2012), 475–494.
- (15) S.-M. Ngai, Spectral asymptotics of Laplacians associated to one-dimensional iterated function systems with overlaps, *Canad. J. Math.* **63** (2011), 648–688.
- (16) Q. Deng and S.-M. Ngai, Conformal iterated function systems with overlaps, *Dyn. Syst.* **26** (2011), 103–123.
- (17) S.-M. Ngai, F. Wang, X. Dong, Graph-directed iterated function systems satisfying the generalized finite type condition, *Nonlinearity* **23** (2010), 2333–2350.
- (18) J. Chen and S.-M. Ngai, Eigenvalues and eigenfunctions of one-dimensional fractal Laplacians defined by iterated function systems with overlaps, *J. Math. Anal. Appl.* **364** (2010), 222–241.
- (19) Q. Deng and S.-M. Ngai, Multifractal formalism for self-affine measures with overlaps, *Arch. Math.* **92** (2009), 514–625.
- (20) K.-S. Lau, S.-M. Ngai, and X.-Y. Wang, Separation conditions for conformal iterated function systems, *Monatsh. Math.* **156** (2009), 325–355.
- (21) S.-M. Ngai, Multifractal structure of noncompactly supported measures, *Fractals* **16** (2008), 209–226.
- (22) K.-S. Lau and S.-M. Ngai, A generalized finite type condition for iterated function systems, *Adv. Math.* **208** (2007), 647–671.
- (23) J. Hu, K.-S. Lau, and S.-M. Ngai, Laplace operators related to self-similar measures on  $\mathbb{R}^d$ , *J. Funct. Anal.* **239** (2006), 542–565.
- (24) D.-W. Deng and S.-M. Ngai, Vertices of connected self-similar tiles in the plane, *Illinois J. Math.* **49** (2005), 857–872.
- (25) S.-M. Ngai and Y. Wang, Self-similar measures associated to IFS with non-uniform contraction ratios, *Asian J. Math.* **9** (2005), 227–244.
- (26) F. Jordan and S.-M. Ngai, Reptiles with holes, *Proc. Edinb. Math. Soc. (2)* **48** (2005), 651–671.

- (27) S.-M. Ngai and T.-M. Tang, Topology of connected self-similar tiles in the plane with disconnected interiors, *Topology Appl.* **150** (2005), 139–155.
- (28) S.-M. Ngai and T.-M. Tang, A Technique in the topology of connected self-similar tiles, *Fractals* **12** (2004), 389–403.
- (29) M. Das and S.-M. Ngai, Graph-directed iterated function systems with overlaps, *Indiana Univ. Math. J.* **59** (2004), 109–134.
- (30) S.-M. Ngai and N. Nguyen, The Highway dragon revisited, *Discrete Comput. Geom.* **29** (2003), 603–623.
- (31) E. J. Bird, S.-M. Ngai, and A. Teplyaev, Fractal Laplacians on the unit interval, *Ann. Sci. Math. Québec* **27** (2003), 135–168.
- (32) K.-S. Lau and S.-M. Ngai, Dimensions of the boundaries of self-similar sets, *Experiment. Math.* **12** (2003), 13–26.
- (33) S.-M. Ngai and Y. Wang, Hausdorff dimension of self-similar sets with overlaps, *J. London Math. Soc. (2)* **63** (2001), 655–672.
- (34) K.-S. Lau, S.-M. Ngai, and H. Rao, Iterated function systems with overlaps and self-similar measures, *J. London Math. Soc. (2)* **63** (2001), 99–116.
- (35) K.-S. Lau and S.-M. Ngai, Second-order self-similar identities and multifractal decompositions, *Indiana Univ. Math. J.* **49** (2000), 925–972.
- (36) A.-H. Fan, K.-S. Lau, and S.-M. Ngai, Iterated function systems with overlaps, *Asian J. Math.* **4** (2000), 527–552.
- (37) S.-M. Ngai, V. Sirvent, J. J. P. Veerman, and Y. Wang, On 2-reptiles in the plane, *Geom. Dedicata* **82** (2000), 325–344.
- (38) K.-S. Lau and S.-M. Ngai, Multifractal measures and a weak separation condition, *Adv. Math.* **141** (1999), 45–96.
- (39) K.-S. Lau and S.-M. Ngai,  $L^q$ -spectrum of Bernoulli convolutions associated with P.V. numbers, *Osaka J. Math.* **36** (1999), 993–1010.
- (40) K.-S. Lau and S.-M. Ngai,  $L^q$ -spectrum of the Bernoulli convolution associated with the golden ratio, *Studia Math.* **131** (1998), 225–251.
- (41) S.-M. Ngai, Multifractal decomposition for a family of overlapping self-similar measures, *Fractal frontiers* (Denver, CO, 1997), 151–161, World Sci. Publishing, River Edge, NJ, 1997.
- (42) S.-M. Ngai, A dimension result arising from the  $L^q$ -spectrum of a measure, *Proc. Amer. Math. Soc.* **125** (1997), 2943–2951.

## PAPERS ACCEPTED FOR PUBLICATION

- (1) S.-M. Ngai, W. Tang, and Y. Xie, Spectral asymptotics of one-dimensional fractal Laplacians in the absence of second-order identities, *Discrete Contin. Dyn. Syst.*, to appear.  
[http://archive.ymsc.tsinghua.edu.cn/pacm\\_download/128/4613-Ngai-Tang-Xie\\_2017\\_version\\_2.pdf](http://archive.ymsc.tsinghua.edu.cn/pacm_download/128/4613-Ngai-Tang-Xie_2017_version_2.pdf).
- (2) S.-M. Ngai and Y. Xie,  $L^q$ -spectrum of self-similar measures with overlaps in the absence of second-order identities, *J. Aust. Math. Soc.*, to appear.  
[http://archive.ymsc.tsinghua.edu.cn/pacm\\_download/128/8182-Lq\\_spectrum\\_Ngai\\_Xie.pdf](http://archive.ymsc.tsinghua.edu.cn/pacm_download/128/8182-Lq_spectrum_Ngai_Xie.pdf)

## SUBMITTED PREPRINTS

- (1) Q. Gu, J. Hu and S.-M. Ngai, Two-sided sub-Gaussian estimates of heat kernels on intervals for self-similar measures with overlaps, submitted.  
[http://archive.ymsc.tsinghua.edu.cn/pacm\\_download/128/4610-hkgrm.pdf](http://archive.ymsc.tsinghua.edu.cn/pacm_download/128/4610-hkgrm.pdf)
- (2) S.-M. Ngai, W. Tang, and Y. Xie, Wave propagation speed on fractals, submitted.  
[http://archive.ymsc.tsinghua.edu.cn/pacm\\_download/128/4707-Ngai-Tang-Xie\\_updated\\_Dec\\_2016.pdf](http://archive.ymsc.tsinghua.edu.cn/pacm_download/128/4707-Ngai-Tang-Xie_updated_Dec_2016.pdf)
- (3) S.-M. Ngai and W. Tang, Eigenvalue asymptotics and Bohr's formula for fractal Schrödinger operators, submitted.  
[http://archive.ymsc.tsinghua.edu.cn/pacm\\_download/128/8873-Ngai-Tang\\_Schrodinger\\_2017.pdf](http://archive.ymsc.tsinghua.edu.cn/pacm_download/128/8873-Ngai-Tang_Schrodinger_2017.pdf)

## SELECTED PRESENTATIONS

- (1) *Spectral asymptotics of some one-dimensional fractal Laplacians*, 37th Southeastern Atlantic-Regional Conference on Differential Equations, October 7–8, 2017, Kennesaw States University, Atlanta, GA,
- (2) *Spectral asymptotics of fractal Laplace and Schrödinger operators*, plenary speaker, 2017 Chinese National Conference on Fractals and Dynamical Systems, August 28–30, 2017, Renmin University (Suzhou Campus), Suzhou, China.
- (3) *Spectral dimension of a class of one-dimensional fractal Laplacians*, keynote speaker, 6th Cornell Conference on Analysis, Probability, and Mathematical Physics on Fractals, June 13–17, 2017, Cornell University, Ithaca, NY.
- (4) *Spectral asymptotics of a class of one-dimensional fractal Laplacians*, invited speaker, Harmonic Analysis and Geometry of Fractal Sets, February 3–5, 2017, Ohio State University, OH.
- (5) *Spectral asymptotics of one-dimensional fractal Laplacians in the absence of second-order identities*, Analysis on Fractals and Graphs Workshop, December 26–30, 2016, Tsinghua Sanya Mathematics Forum, Hainan, China.

- (6) *The multifractal formalism and spectral asymptotics of self-similar measures with overlaps*, Colloquium, Center of Mathematical Sciences and Applications, September 14, 2016, Harvard University, USA.
- (7) *Wave propagation speed on fractals*, Workshop on theory of fractals and related topics, June 03–05, 2016, Zhejiang University, China.
- (8) *Wave propagation speed on fractals*, AMS Spring Eastern Sectional Meeting, March 19–20, 2016, State University of New York at Stony Brook, Stony Brook, NY, USA.
- (9)  *$L^q$ -spectrum and multifractal formalism of a class of self-similar measures of general finite type*, 2015 Chinese National Mathematical Conference on Fractal Theory, June 29, 2015, Central China Normal University, Wuhan, China.
- (10) *Topological properties of a class of three dimensional self-affine tiles, part I: connectedness*, Joint Carnegie Mellon – Georgia Southern Workshop on Fractal Geometry and Analysis, April 18, 2015, Georgia Southern University, Statesboro, GA. *Part II: homeomorphism to a round 3-ball*, April 19, 2015, Carnegie Mellon University, Pittsburgh, PA, USA.
- (11) *Topological properties of a class of self-affine tiles in  $\mathbb{R}^3$* , American Mathematical Society’s Spring Central Sectional Meeting, March 13–14, 2015, Michigan State University, MI, USA.
- (12) *Eigenvalue estimates of Laplacians defined by fractal measures*, 5th Conference on Analysis, Probability and Mathematical Physics on Fractals, June 11–15, 2014, Cornell University, Ithaca, NY, USA.
- (13) *Laplace operators defined by fractal measures*, 2013 Chinese National Conference on Fractals and Dynamical Systems, June 1–2, 2013, Zhejiang Wanli University, Ningbo, Zhejiang, China.
- (14) *Infinite iterated function systems with overlaps*, International Conference on Advances in Fractals and Related Topics, December 10–14, 2012, The Chinese University of Hong Kong.
- (15) *Infinite iterated function systems with overlaps*, 2012 Chinese National Conference on Fractal Theory and Dynamical Systems, August 7–10, 2012, Lijiang, Yunnan, China.
- (16) *Boundary theory on the Sierpinski gasket and Hata tree*, Workshop on Fractal Geometry and Dynamical Systems, Hunan Normal University, Changsha, Hunan, China, May 25–26, 2012.
- (17) *Boundary theory on the Sierpinski gasket and Hata tree*, Workshop on Nonlinear Analysis, October 20–22, 2011, Huazhong University of Science and Technology, Wuhan, China.
- (18) *Martin boundary and exit space on the Sierpinski gasket and other fractals*, American Mathematical Society’s Northeastern Sectional Meeting, September 10–11, 2011, Cornell University, Ithaca, NY.
- (19) *A class of one-dimensional wave equations defined by IFSs with overlaps*, Conference on fractals and dynamical systems, May 28–29, 2011, Zhangjiajie, Hunan, China.
- (20) *One-dimensional wave equations defined by fractal Laplacians*, AMS 2010 Fall Eastern Sectional Meeting, October 2–3, 2010, Syracuse University, NY.



- (21) *Fractal differential equations defined by iterated function systems with overlaps*, Optimal Configurations on the Sphere and Other Manifolds, May 17–20, 2010, Vanderbilt University, Nashville, TN, USA.
- (22) *Fractal Laplacians Defined by Iterated Function Systems with Overlaps*, American Mathematical Society’s 2010 Spring Central Section Meeting, April 10–11, 2010, Macalester College, St Paul, MN, USA.
- (23) *Spectral asymptotics of fractal Laplacians defined by IFSs with overlaps*, The 29th Annual Southeastern-Atlantic Regional Conference on Differential Equations, Mercer University, GA, USA. October 17, 2009.
- (24) *Conformal iterated function systems with overlaps*, Workshop on Fractals and Tilings 2009, Strobl, Austria, July 6–10, 2009.
- (25) *Fractal Laplacians defined by iterated function systems with overlaps*, Workshop on fractal geometry and related topics, Zhuhai Campus, Zhongshan University, China, December 2008.
- (26) *Fractal Laplacians defined by iterated function systems with overlaps and their spectral asymptotics*, Workshop on fractal geometry and the theory of tilings, Zhongshan University, China, July 2008.
- (27) *Analysis on fractals defined by iterated function systems with overlaps*, Third Conference on Analysis and Probability on Fractals, Cornell University, June 2008.
- (28) *Spectral dimension of fractal Laplacians defined by iterated function systems with overlaps*, Workshop on Functional Analysis and Optimization Theory, The Chinese University of Hong Kong, December 2006.
- (29) *Multifractal structure of noncompactly supported measures*, Special Session on Fractals and Tilings, 21st Summer Conference on Topology and its Applications, Georgia Southern Univ. Statesboro, GA, July 2006.
- (30) *On a class of Laplacians defined by fractal measures*. Conference on Differential & Difference Equations and Applications, August 5, 2005, Florida Institute of Technology, Melbourne, Florida.
- (31) *Fractal Laplace operators on bounded open subsets of Euclidean spaces*. 2nd Conference on Analysis and Probability on Fractals, Cornell University, Ithaca, NY, May–June 2005.
- (32) *Fractal Laplace operators on open subsets of  $\mathbb{R}^d$* . International Conference on Applicable Harmonic Analysis, Hangzhou, China, May 2005.
- (33) *Iterated function systems of generalized finite type*. The Third International Congress of Chinese Mathematicians (ICCM 2004), Hong Kong, December 2004.
- (34) *A generalized finite type condition for iterated function systems*, 2004 AMS Central Sectional Meeting, Northwestern University, Evanston, IL, October 2004.
- (35) *Hausdorff dimension of the boundaries of a class of self-similar sets*, International Conference on Fractal Geometry & Stochastics III, Friedrichroda, Germany, March 2003.

- (36) *Topological structure of reptiles and self-affine tiles*, AMS Southeastern Sectional Meeting, Univ. of Central Florida, Orlando, FL, Nov 2002.
- (37) *Fractal Laplacians on an interval*, Conference on Analysis and Probability on Fractals, Cornell Univ., Ithaca, NY, June, 2002.
- (38) *Eigenvalues and eigenfunctions of a class of fractal Laplacians on the unit interval*, Special Session on Dynamic Equations on Time Scales, AMS-MAA Joint Meeting, Atlanta, GA, March 2002.
- (39) *Graph-directed iterated function systems with overlaps*, Special Session on Fractals of the AMS Meeting, Columbus, OH, Sept. 2001.
- (40) *Absolute continuity of self-similar measures*, Furman Univ., Greenville, SC, July 1999.
- (41) *Hausdorff dimension of overlapping self-similar sets*, Southeastern Analysis Meeting, Vanderbilt Univ., Nashville, TN, May 1999.
- (42) *Dilation equations and iterated function systems with overlaps*, Minisymposium on “Wavelets and Their Applications”, SIAM Annual Meeting, Atlanta, GA, May 1999.
- (43) *Hausdorff dimension of overlapping self-similar fractals*, Georgia Tech, Jan. 1999.
- (44) *Second-order self-similar identities*, AMS special session meeting on Fractal Geometry and Related Topics, Louisville, KY, March 1998.
- (45) *Self-similarity in fractals, wavelets and tilings*, Cornell Univ., March 1998.
- (46) *Multifractal formalism for overlapping self-similar measures*, Cornell Univ., Feb. 1998.
- (47) *Some Applications of the Renewal Theorem in Fractal Geometry*, Conference on Dynamical Systems and Fractal Geometry, Zhongshan Univ., China, Dec. 1997.
- (48) *Using mathematical software in education and research*, South China Normal Univ., Dec. 1997.
- (49) *Dilation equations with scaling factor equal to the golden ratio*, Workshop on Wavelets and Their Applications, The Chinese U. of Hong Kong, May 1997.
- (50) *Multifractal decomposition for a family of overlapping self-similar measures*, Fractal 97 — The 4-th International Multidisciplinary Working Conference on Fractals, Denver Colorado, USA, April 1997.
- (51) *Multifractal formalism and a dimension formula*, Workshop on nonlinear dynamics, chaos and complexity, Hong Kong Baptist Univ., March 1996.
- (52)  *$L^q$ -dimension of the Bernoulli convolution associated with the  $P.V.$  numbers*, Conference in Wavelets and Fractals, Univ. of Pittsburgh, May 1994.

### GRADUATE STUDENTS

Ph.D. student supervising (Hunan Normal): Wei Tang

Ph.D. student (Hunan Normal): Yuanyuan Xie (2017)

M.Sc. students supervising (Hunan Normal): Fan Zhang, Huijia Sheng

M.Sc. students supervised (Georgia Southern): Jie Chen (2009), John F.-C. Chan (2011)

M.Sc. students co-supervised (Hunan Normal): Fei Wang (2010), Jixi Tong (2011), Juan Tao (2012)

### TEACHING EXPERIENCE

1. *Graduate courses taught:* Real Analysis, Complex Analysis, Functional Analysis, Operations Research, Fractal Geometry.
2. *Undergraduate courses taught:* College Algebra, Pre-Business Calculus, Pre-calculus, Survey of Calculus, Calculus I, Calculus II, Calculus III, Multivariable Calculus, Advanced Calculus I, Mathematics Laboratory I (MATLAB) and II (Mathematica), Discrete Mathematics, Elementary Linear Algebra, Ordinary Differential Equations, Mathematical Structures, Analysis I, Analysis II, Student Oriented Teaching, Intermediate Linear Algebra, Linear Programming, Stochastic Processes, Game Theory, Functions of a Complex Variable, Introduction to Fractal Geometry.
3. *Special course taught:* Complex Numbers and Non-Euclidean Geometry, Enrichment Programme for Young Mathematics Talents, Chinese U. of Hong Kong, Summer 03.

### COMMITTEE SERVICE

- (1) University Faculty Senate (2010–2013)
- (2) College Promotion and Tenure Committee (2009–2010, 2013–2015)
- (3) Colloquium Committee (2005–2006 (chair), 2006–2007, 2007–2008, 2010–2014)
- (4) Post Tenure Review Committee (2007–2008, 2013–2014(chair), 2014–2015)
- (5) Search Committee (2006–2007, 2014–2015)
- (6) Peer Review Committee (2010–2011)
- (7) College of Science and Technology Academic Excellence Committee (2006–2008)
- (8) Promotion and Tenure Committee (2006–2007, 2007–2008, 2015–2016)
- (9) Graduate Committee (2005–2006, 2006–2007, 2007–2008)
- (10) Colloquium Coordinator (2004–2005)
- (11) Colloquium/Seminar Committee (chair) (Fall 2003)
- (12) Mathematics Committee (2002–2003, 2003–2004)
- (13) Undergraduate Research Committee (2002–2003)
- (14) Peace Chair Search Committee (2001–2002)
- (15) Mathematics Tournament Committee (2002–2003, 2001–2002, 2000–2001)
- (16) Calculus Committee (2000–2001)

### OTHER

1. Member, American Mathematical Society, 1988–present.

2. Member, The Hong Kong Mathematical Society, 1995–present.
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